CIRRA Task 6 Hydraulic Plume Control Analysis Overview

November 27, 2001

ENVIRON

Hydraulic Analysis Overview

- 19 different pumping configurations
  - Become 29 different specific response alternatives with engineering considerations
- Evaluated effectiveness using model outputs
  - Reverse capture zones for SCWC/COSM split
  - “Flushout curves” for influent concentrations at extraction wells
  - Mass removal rates
  - Mobilizing mass to Lower Silverado
  - Effect on Sepulveda/Venice water levels
  - Attenuation between Northern Hotspot and Extraction Wells
- Sensitivity/Uncertainty Analysis
  - Task 6 vs. CIRRA Model

Model Explanation

- Task 6 Model
  - Base model for analyses
  - Presented at May 1 meeting
  - Interim data from the field as of ~ March 2001
- CIRRA Model
  - Most recent, used in sensitivity analysis
  - More detailed interpretation of Shallow Aquitard
  - Layer elevations updated
  - Extraction from 1 model layer in each production well
  - Horizontal conductivity revised for EBF and aquifer tests
- Interim 98-Optimized Model
  - Shallow Aquitard vertical conductivity refined
  - Horizontal conductivity revised for EBF, Ch-16 aquifer test
- Task 6 Fine Grid Model
  - Extraction from 1 model layer in each production well

Model Limitations/Uncertainties

- General transport model considerations
  - Low concentrations difficult to predict
  - No retardation, dispersion
- Fine scale variations not accounted for
- Predictions outside range of CIRRA field investigation less reliable

Pumping Rates in Alternatives

Alternative	Sepulveda/Palms Extraction, Starts 1/2002 (gpm)	Regional Hotspot Remediation, Starts 1/2002 (gpm)	Sepulveda/Venice Extraction, Starts 5/2001 (Shell + Mobil, gpm)	Northern Well Extraction, Starts 1/2003 (acre-ft/yr)	Step Times (for COSM, SCWC)	COSM Extraction (acre-ft/yr)	SCWC Extraction (acre-ft/yr)
1A1, 1B	125		140+36				
1A2	125	300 [1]	140+36				
2A1	125		140+36	1000	1/04	4862	1035
2A2	125		140+36		1/04	7562	1335
2A3	125		140+36		1/04	8075	1425
2B1	125		140+36		1/04	5862	1035
2B2	125		140+36		1/04	6800	1200
2C1	125		140+36		Jan-May,Sep-Dec [2]	5299	1200
					Jun-Aug [2]	11302	
2C2	125		140+36		Jan-May,Sep-Dec [2]	4761	1200
					Jun-Aug [2]	12918	
2D1	125		140+36		1/04,1/14.1/24 [3]	9350	1650
					1/07,1/17.1/27 [3]	5708	1008
2D2	125		140+36		1/04,1/09.1/14.1/19,1/24 [3]	7300	3700
					1/06,1/11,1/16,1/21,1/26 [3]	3982	2018
2D3	125		140+36		1/04,1/14,1/24 [3]	6300	3700
					1/09,1/19 [3]	2656	1344
2D4	125		140+36		1/04	9350	1650
					1/09	6800	1200
3A	125		140+36		1/04	1000	0
3B	125		140+36		1/04	2500	0
3C1	125		140+36		1/04	4000 [4]	706
3C2	125		140+36		1/04	4000 [4]	706
3D	125		140+36		1/04	1000	0
					1/06	2500	0
					1/08	4000	706
4	125	300 [1]	140+36	1000	1/03	0	0
					1/05	1000 [5]	0
					1/07	2500 [5]	352
					1/10	4862 [6]	1035

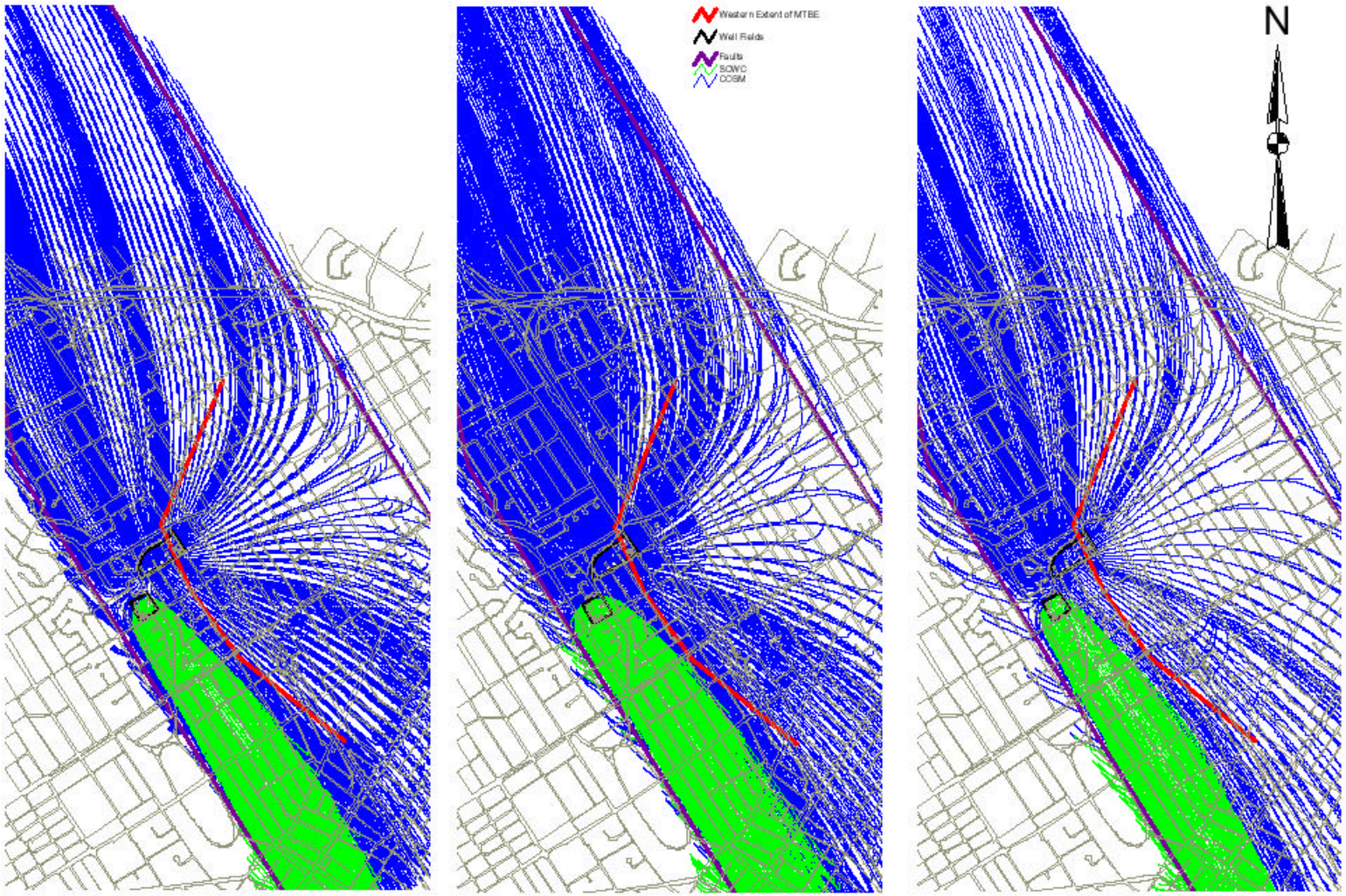
Notes

1. Individual well rates change through time to better match MTBE migration (see text). Total flow rate constant.
2. Annual seasonal variations.
3. Periodic shifts in pumping, dates represent start month/yr
4. Different distribution of rates between extraction wells.
5. Phased distribution of wells. Wells used during pumping change, see text and Table 4.2.2-2 for details.
6. Analysis of this alternative shows that wells can be used as the Impacted Parties wish by this time. Rates shown are for planning purposes.

Model Outputs

- Reverse capture zones for SCWC/COSM split
- “Flushout curves” for influent concentrations at extraction wells
- Forward 25-year capture zones
- Time to affect subregional capture
- Time to 95% mass removed
- Attenuation (dilution) between Northern Hotspot and Extraction Wells

Reverse Capture Zones for SCWC/COSM Split, 2B2



Base Model

Interim 98-Optimized Model

CIRRA Model

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